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Assessing the Quality and Knowledge Contribution of MIS Quarterly: A Citation Analysis

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Abstract

This paper employs citation analysis to investigate empirically the influence of MIS Quarterly on both IS and other literature. Specifically, we examine the impact of source article category, method type, and research area on article citation rates. Our results reveal that the citation-based quality indices of MISQ have been improving over the years. In addition, among the six categories of MISQ source articles, the methodological articles on average receive the most citings per article. Moreover, of the source articles employing different research methods, surveys, case studies, and lab experiments are more likely to be cited. Among source articles addressing different research areas, those focusing on IT and individuals receive the most citings per article. Finally, our analysis also shows that MISQ articles are well-cited by researchers from both IS and other disciplines, implying that IS does make knowledge contribution to other disciplines.

Keywords

Citation analysis, IS research, research area, research method, MIS Quarterly.

INTRODUCTION

Citation analysis has been widely used to empirically evaluate the research contributions of articles, journals, institutions, and individuals. This objective analytical approach heightens our understanding of how knowledge exchanges within the field and between the field and other disciplines. Specifically, we can gain an insight of which types of journal articles within IS are most likely to be cited, and from where IS journal articles are most likely to be cited.

In this study, we use citation analysis to assess the knowledge contribution made by one of our top-ranked IS journals, MIS Quarterly (MISQ), to both IS and other disciplines. Though a number of researchers (Katerattanakul and Han 2003; Katerattanakul and Hong 2003; Loebbecke, Berthod, and Huyskens 2007) have assessed the influence of our research publications with this technique, most prior research has contributed little to our understanding of why certain articles are more or less likely to be cited by other articles. Hoffman and Holbrook (1993) argued that the method type and subject area of research articles reflect the research orientation of the author and the intellectual structure of the discipline. Thus, we will empirically examine the impact of the method type and research area of MISQ articles on subsequent citations of the articles. In addition to these two characteristics of research articles, we will also investigate the relationship between the nature of publication in MISQ (article category) and its frequency of citations made by scholars both in IS and other disciplines.

The rest of this paper is organized as follows. The next section presents the research methodology (how we collect and analyze the data). We then report the findings and discuss the research patterns. Finally, we conclude the paper with limitations and directions for future research.

METHODOLOGY

Sample

MISQ was selected for study because it is the most prestigious and important journal in the IS discipline. Evidence from the Social Science Citation Index Journal Citation Reports indicates that the ranking of MISQ (in terms of the impact factor) has been consistently high (Loebbecke et al. 2007). In this study, we included all 242 articles (source articles) published in MISQ from 1999 to 2006 in the sample. We also compiled a list of citations made to each of the source articles by other articles published during 2001 and 2008. A two-year lag time between publication of the source articles and their citations was used to ensure a reasonable citation history for analysis. The citation data were collected from the Social Science Citation Index (SSCI) and the Science Citation Index (SCI). In all, 5825 citations are made to those 242 source articles published in 349 different journals.

Procedure

One of the major objectives of this study is to assess the quality and knowledge contributions of MISQ. Based on the collected citation data, we have derived six citation-based indices of journal quality (in accordance with Garfield 1979): Citations per article, un-cited ratio, 20+ citations, self- citations, annual mean citation rate per article, and current article impact.

Another important objective of this study is to examine the impact of the article category, method type, and research area on subsequent citations of the source articles. For each source article, two of the authors independently classified the article into pertinent article category (including editorial, theory, issues and opinion, methodology, meta-analysis and review, empirical study), method type (including positivist, interpretive, survey, lab experiment, field experiment, protocol analysis, archival studies, instrument development, case study, grounded theory, ethnography, action research, mixed method, and others) and research area (including IT and individuals, IT and groups, IT and organizations, IT and markets, and IS development). The coding scheme was developed based on the original MISQ manuscript category and prior literature (e.g., Sidorova et al. 2008). Over 95% of the classifications were found consistent between the two authors. For those inconsistent records, the two authors revisited the source articles and resolved the inconsistencies together. For the 349 citing journals, we modified the journal categories provided in SSCI and SCI and grouped the citing journals into eight broad categories (See Table 4 in the Results section).

RESULTS

Relative Quality of Source Articles

Table 1 summarizes the citation data collected. In addition to total number of citations made to the source articles, we have also recorded the number of source articles published in each year that never receive any citation and the number of source articles that are cited at least 20 times during 2001-2008. Moreover, we collected the number of self-citations for the source articles published in each year.

Table 1. Citation Data Collected

Collected Data	Source Article Publication Year								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**Total**
Citations made to MISQ articles published in each year (Cited counts)	1043	1062	863	457	1076	530	528	266	**5825**
Number of MISQ articles, published in each year, that had never been cited	4	1	2	3	2	4	3	3	**22**
Number of MISQ articles, published in each year, that had received at least 20 citations	19	18	15	13	20	13	16	6	**120**
Number of self-citations coded for MISQ articles published in each year	28	27	17	18	24	26	31	43	**214**
Number of years since publication (until year 2008)	9	8	7	6	5	4	3	2	

We derived a set of citation-based quality indices (see Table 2) based on the data in Table 1. As illustrated in Table 2, *Citations Per Article* are highest in 2003 and lowest in 2006, showing that the number of citations reaches its peak in approximately 5-7 years after the publication year and then starts declining (Katerattanakul & Hong, 2003). On average, each source article receives 24.07 citations, much more than the 13.1 *Citations Per Article* reported by Katerattanakul and Hong (2003) in their citation analysis of MISQ articles published between

1989 and 1998. The index is also higher than the 13.3 *Citations Per Article* for Journal of Consumer Research (JCR)(Cote, Leong, & Cote, 1991). Only 9.09% of the source articles are never cited. This *Un-Cited Ratio* is much less than the 45% found in physical science (Begley, 1991) but is higher than the 6% reported by Katerattanakul and Hong (2003) and the 4.5% for JCR (Cote, et al., 1991). On the other hand, approximately half of the source articles are cited at least 20 times. Thus, the *20+ Citations* index is higher than the 21.9% reported by Katerattanakul and Hong (2003) and the 19.8% for JCR (Cote, et al., 1991). The *Self-Citation Index* for the source articles is 3.67 of all citations. This percentage is lower than the 7.8% reported by Katerattanakul and Hong (2003) and the 7.4% found for JCR (Cote, et al., 1991). The *Annual Mean Citation Rate Per Article* for the source articles is 4.77 citations per year. This result compares favorably to the 2.0 reported by Katerattanakul and Hong (2003) and the 1.7 citations per year for JCR (Cote, et al., 1991). Finally, the *Current Article Impact* 2.52 for source articles (see Table 2) is higher than the 1.1 index reported by Katerattanakul and Hong (2003) and the 2.07 for JCR (Cote, et al., 1991).

Table 2. Citation-Based Quality Indices

Citation-Based Index	Source Article Publication Year								
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**Mean**
Citations per article	31.61	35.40	41.10	21.76	41.38	18.28	15.09	5.66	24.07
Un-cited ratio (percentage)	12.12	3.33	9.52	14.29	7.69	13.79	8.57	6.38	9.09
20+ citations (percentage)	57.58	60.00	71.43	61.90	76.92	44.83	45.71	12.77	49.59
Self-citations (percentage)	2.68	2.54	1.97	3.94	2.23	4.91	5.87	16.17	3.67
Annual mean citation rate per article	3.51	4.43	5.87	3.63	8.28	4.57	5.03	2.83	4.77
	Citation Article Publication Year								
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**Mean**
Current article impact	1.25	1.78	1.95	2.06	3.38	3.14	3.71	2.85	**2.52**

Table 3. Summary of Citations by Source Article Category, Method Type, and Research Area

Source Article Category	Citation Information		
	# of Source Article	**# of Citing**	**Citings Per Article**
Editorial	43	137.00	3.19
Theory	14	251.00	17.93
Issues and Opinion	20	284.00	14.20
Methodology	5	310.00	62.00
Meta-Analysis & Review	17	768.00	45.18
Empirical	143	4076.00	28.50
Total	**242**	**5825.00**	**24.07**

Source Article Research Area[1]	Citation Information		
	# of Source Article	**# of Citing**	**Citings Per Article**
IT and Individuals	52	2129	40.94
IT and Groups	19	403	21.21
IT and Organizations	57	1312	23.02
IT and Markets	21	419	19.95
IS Development	10	103	10.30

Source Article Method Type	Citation Information		
	# of Source Article	**# of Citing**	**Citings Per Article**
Positivist	109	3505.00	32.16
Interpretive	34	571.00	16.79
Survey	49	2252.00	45.96
Lab experiment	22	370.00	16.82
Field experiment	2	110.00	55.00
Protocol analysis	1	26.00	26.00
Archival studies	11	270.00	24.55
Instrument development	2	38.00	19.00
Case study	29	596.00	20.55
Grounded theory	7	153.00	21.86
Ethnography	1	17.00	17.00
Action research	6	45.00	7.50
Mixed	11	174.00	15.82
Others	2	25.00	12.50

[1] Some source articles may fall in two or more research areas.

Effects of Source Article Characteristics on Citation Patterns

Table 3 summarizes the number of different categories of source articles published in MISQ each year during 1999-2006. As illustrated by the table, empirical research represents 59.1% (calculated by 143/242) of the source articles included in this citation analysis. Approximately 3/4 of the empirical studies are carried out in positivist fashion, suggesting that, despite the increasing recognition of the value of interpretive research and acceptance of such articles for publication, positivist research still dominates published MISQ articles. Surveys represent a little over 1/3 of the empirical research source articles, followed by case studies (about 20%) and laboratory experiments (about 15%). Of the 143 empirical source articles that have an identifiable research area, 39.9% of them focus on IT and organizations whereas 36.4% address how individuals interact with IT.

Table 3 also illustrates the *number of citations* and the *Citings Per Article* index for source articles of different categories, employing different research methods, and focusing on different research areas. Among the six categories of MISQ source articles, methodological articles on average receive the most *Citings Per Article* (62), followed by meta-analyses and reviews (45.18) and empirical articles (28.5). In terms of source article research method, positivist research articles receive an average of 32.16 *Citings Per Article*, almost two times the citings receive by an interpretive article on average (16.79). More specifically, field experiments receive the most *Citings Per Article* (55), followed by surveys (45.96), whereas action research receive the fewest *Citings Per Article* (7.5). Finally, among source articles addressing different research areas, those focusing on IT and individuals receive the most *Citings Per Article* (40.94) whereas those focusing on IS development receive the fewest (10.3).

Effects of Source Article Characteristics on Citing Journal Categories

IS research has traditionally borrowed ideas from reference disciplines such as computer science, management science, and organization science. Now that IS has established itself as a legitimate academic discipline, it is interesting and important for IS researchers to understand the knowledge contribution of IS to other disciplines. If IS research influences other disciplines, articles published in IS academic journals should be cited by articles published in other disciplines' journals.

As described in the Methodology section, we compiled a list of the citations made to each of the source articles and categorized the citing journals into eight categories, as shown in Table 4. Although the highest proportion (68.45%) of the citations made to the source articles is made within the IS discipline itself (indicated by citing journals in the IS and IS/IT Management category), more than 30% of the citations are attributed to other areas of study, an indication that IS does make knowledge contribution to other disciplines.

To better understand the effects of source article method type and research area on citing patterns, we conducted a series of cross-tab analyses, the results of which are presented in Table 5, Table 6, and Table 7.

As illustrated in Table 5 and Table 6, IS and IS/IT Management journals dominate citations made to the source articles across different research method types. For the three method types that have received the greatest number of citations (i.e., surveys, case studies, and lab experiments), the highest proportion of the citations is made by articles published in journals categorized as IS and IS/IT Management, followed usually by those published in journals categorized as General Business and Management. On the other hand, for the three journal categories that contribute the most citations to the source articles (i.e., IS and IS/IT Management, General Business and Management, and Management Science and Operations Research), most of the citations are made to research employing surveys, case studies, lab experiments, and archival studies.

Similar distribution of citations is also observed in Table 7. Across different research areas, the highest proportion of the citations made to the source articles is made by articles published in journals categorized as IS and IS/IT Management, General Business and Management, and Management Science and Operations Research . For journals in the category of IS and IS/IT Management or General Business and Management, most of the citations made to the source articles are attributed to the research area IT and Individuals, followed by the research area IT and Organizations; the order is reversed for Management Science and Operations Research journals.

CONCLUSION AND DISCUSSION

In this study, we have employed citation analysis to assess the quality and knowledge contribution of the most prestigious journal in IS, MISQ. This study improves prior citation analysis practices in IS by offering empirical insights into the importance of different article categories, method types, and subject areas in supporting the goal of greater knowledge exchange both within and outside of the IS discipline. Our results suggest that, not only have the citation-based quality indices of MISQ been improving over the years, the quality of MISQ is also

Table 4. Summary of Citing Journal

Category of Citing Journals	Number of Journals	Number of Citings	% of Citings
Computer Science and Engineering	38	316	5.42
General Business and Management	72	602	10.33
Management Science and Operations Research	14	401	6.88
IS and IS/IT Management	68	3987	68.45
Other Sciences and Engineering	24	45	0.77
Psychology and Sociology	61	282	4.84
Finance and Economics	18	23	0.39
Others	54	169	2.90
Total	**349**	**5825**	**100**

Table 5. Cross-Tab Analysis of Source Article Method Type by Citing Journal Category – Part I

Source Article Method Type		Citing Journal Category								Total
		Computer Science and Engineering	Finance & Economics	General Business and Management	IS and IS/IT Management	Management Science and Operations Research	Other Sciences and Engineering	Others	Psychology and Sociology	
Interpretive	Count	16	0	62	413	33	3	13	31	**571**
	% within MT	2.8%	0.0%	10.9%	72.3%	5.8%	0.5%	2.3%	5.4%	**100.0%**
	% within CJC	7.2%	0.0%	14.9%	15.0%	11.1%	12.0%	9.6%	14.7%	**14.0%**
Positivist	Count	205	18	354	2,341	263	22	122	180	**3,505**
	% within MT	5.8%	0.5%	10.1%	66.8%	7.5%	0.6%	3.5%	5.1%	**100.0%**
	% within CJC	92.8%	100.0%	85.1%	85.0%	88.9%	88.0%	90.4%	85.3%	**86.0%**
Total	Count	221	18	416	2,754	296	25	135	211	**4,076**
	% within MT	5.4%	0.4%	10.3%	68.4%	6.9%	0.8%	2.9%	4.8%	**100.0%**
	% within CJC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**

Notation: MT – Method Type, CJC – Citing Journal's Category

Table 6. Cross-Tab Analysis of Source Article Method Type by Citing Journal Category – Part II

Source Article Method Type		Citing Journal Category								Total
		Computer Science and Engineering	Finance and Economics	General Business and Management	IS and IS/IT Management	Management Science and Operations Research	Other Sciences and Engineering	Others	Psychology and Sociology	
Action Research	Count	1	0	7	31	1	0	1	4	**45**
	% within MT	2.2%	0.0%	15.6%	68.9%	2.2%	0.0%	2.2%	8.9%	**100.0%**
	% within CJC	0.5%	0.0%	1.7%	1.1%	0.3%	0.0%	0.7%	1.9%	**1.1%**
Archival Studies	Count	4	3	45	168	42	1	6	1	**270**
	% within MT	1.5%	1.1%	16.7%	62.2%	15.6%	0.4%	2.2%	0.4%	**100.0%**
	% within CJC	1.8%	16.7%	10.8%	6.1%	14.2%	4.0%	4.4%	0.5%	**6.6%**
Case Studies	Count	10	0	52	459	40	4	8	23	**596**
	% within MT	1.7%	0.0%	8.7%	77.0%	6.7%	0.7%	1.3%	3.9%	**100.0%**
	% within CJC	4.5%	0.0%	12.5%	16.7%	13.5%	16.0%	5.9%	10.9%	**14.6%**
Ethnography	Count	1	0	1	11	0	0	1	3	**17**
	% within MT	5.9%	0.0%	5.9%	64.7%	0.0%	0.0%	5.9%	17.6%	**100.0%**
	% within CJC	0.5%	0.0%	0.2%	0.4%	0.0%	0.0%	0.7%	1.4%	**0.4%**

Notation: MT – Method Type, CJC – Citing Journal's Category

Source Article Method Type		Citing Journal Category								Total
		Computer Science and Engineering	Finance and Economics	General Business and Management	IS and IS/IT Management	Management Science and Operations Research	Other Sciences and Engineering	Others	Psychology and Sociology	
Field Experiment	**Count**	3	8	3	84	10	0	1	1	**110**
	% within MT	2.7%	7.3%	2.7%	76.4%	9.1%	0.0%	0.9%	0.9%	**100.0%**
	% within CJC	1.4%	44.4%	0.7%	3.1%	3.4%	0.0%	0.7%	0.5%	**2.7%**
Grounded Theory	**Count**	5	0	26	96	14	0	5	7	**153**
	% within MT	3.3%	0.0%	17.0%	62.7%	9.2%	0.0%	3.3%	4.6%	**100.0%**
	% within CJC	2.3%	0.0%	6.3%	3.5%	4.7%	0.0%	3.7%	3.3%	**3.8%**
Instrument Development	**Count**	4	0	6	22	0	1	3	2	**38**
	% within MT	10.5%	0.0%	15.8%	57.9%	0.0%	2.6%	7.9%	5.3%	**100.0%**
	% within CJC	1.8%	0.0%	1.4%	0.8%	0.0%	4.0%	2.2%	0.9%	**0.9%**
Lab Experiment	**Count**	33	1	32	245	9	2	25	23	**370**
	% within MT	8.9%	0.3%	8.6%	66.2%	2.4%	0.5%	6.8%	6.2%	**100.0%**
	% within CJC	14.9%	5.6%	7.7%	8.9%	3.0%	8.0%	18.5%	10.9%	**9.1%**

Notation: MT – Method Type, CJC – Citing Journal's Category

Source Article Method Type		Citing Journal Category								Total
		Computer Science and Engineering	Finance and Economics	General Business and Management	IS and IS/IT Management	Management Science and Operations Research	Other Sciences and Engineering	Others	Psychology and Sociology	
Mixed	Count	9	0	19	111	10	0	9	16	**174**
	% within MT	5.2%	0.0%	10.9%	63.8%	5.7%	0.0%	5.2%	9.2%	**100.0%**
	% within CJC	4.1%	0.0%	4.6%	4.0%	3.4%	0.0%	6.7%	7.6%	**4.3%**
Others	Count	1	1	2	16	5	0	0	0	**25**
	% within MT	4.0%	4.0%	8.0%	64.0%	20.0%	0.0%	0.0%	0.0%	**100.0%**
	% within CJC	0.5%	5.6%	0.5%	0.6%	1.7%	0.0%	0.0%	0.0%	**0.6%**
Protocol Analysis	Count	1	0	1	21	0	0	1	2	**26**
	% within MT	3.8%	0.0%	3.8%	80.8%	0.0%	0.0%	3.8%	7.7%	**100.0%**
	% within CJC	0.5%	0.0%	0.2%	0.8%	0.0%	0.0%	0.7%	0.9%	**0.6%**
Survey	Count	149	5	222	1,490	165	17	75	129	**2,252**
	% within MT	6.6%	0.2%	9.9%	66.2%	7.3%	0.8%	3.3%	5.7%	**100.0%**
	% within CJC	67.4%	27.8%	53.4%	54.1%	55.7%	68.0%	55.6%	61.1%	**55.3%**
Total	Count	221	18	416	2,754	296	25	135	211	**4,076**
	% within MT	5.4%	0.4%	10.2%	67.6%	7.3%	0.6%	3.3%	5.2%	**100.0%**
	% within CJC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**

Notation: MT – Method Type, CJC – Citing Journal's Category

Table 7. Cross-Tab Analysis of Source Article Research Area by Citing Journal Category

Source Article Research Area		Citing Journal Category								
		Computer Science and Engineering	Finance and Economics	General Business and Management	IS and IS/IT Management	Management Science and Operations Research	Other Sciences and Engineering	Others	Psychology and Sociology	Total
IT and Groups	Count	17	0	45	264	10	0	21	46	**403**
	% within RA	4.2%	0.0%	11.2%	65.5%	2.5%	0.0%	5.2%	11.4%	**100.0%**
	% within CJC	7.3%	0.0%	9.8%	9.0%	3.1%	0.0%	15.0%	20.0%	**9.2%**
IT and Individuals	Count	165	4	189	1,437	91	18	92	133	**2,129**
	% within RA	7.8%	0.2%	8.9%	67.5%	4.3%	0.8%	4.3%	6.2%	**100.0%**
	% within CJC	70.8%	22.2%	41.2%	49.0%	27.9%	69.2%	65.7%	57.8%	**48.8%**
IS Development	Count	4	0	6	85	2	0	1	5	**103**
	% within RA	3.9%	0.0%	5.8%	82.5%	1.9%	0.0%	1.0%	4.9%	**100.0%**
	% within CJC	1.7%	0.0%	1.3%	2.9%	0.6%	0.0%	0.7%	2.2%	**2.4%**
IT and Markets	Count	14	9	33	287	61	1	6	8	**419**
	% within RA	3.3%	2.1%	7.9%	68.5%	14.6%	0.2%	1.4%	1.9%	**100.0%**
	% within CJC	6.0%	50.0%	7.2%	9.8%	18.7%	3.8%	4.3%	3.5%	**9.6%**
IT and Organizations	Count	33	5	186	861	162	7	20	38	**1,312**
	% within RA	2.5%	0.4%	14.2%	65.6%	12.3%	0.5%	1.5%	2.9%	**100.0%**
	% within CJC	14.2%	27.8%	40.5%	29.3%	49.7%	26.9%	14.3%	16.5%	**30.1%**
Total	Count	233	18	459	2,934	326	26	140	230	**4,366**
	% within RA	5.3%	0.4%	10.5%	67.2%	7.5%	0.6%	3.2%	5.3%	**100.0%**
	% within CJC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	**100.0%**

Notation: RA – Research Area, CJC – Citing Journal's Category

comparable to or better than that of the premium journals in reference disciplines. Our results also suggest that, compared to other article categories, the methodological articles on average receive more citations per article. Whereas source articles employing surveys, case studies, and lab experiments are more likely to be cited, those focusing on IT and individuals receive the most citations per article. Finally, despite the fact that knowledge contributions of MISQ are made mostly to the IS discipline and to other closely related disciplines (i.e., Management Science and Operational Research), more than 30% of the citations made to MISQ target articles are from the articles published in other disciplines, strongly indicating that IS research and MISQ do indeed influence or contribute to other disciplines. Despite this encouraging statistic, more effort can be made by IS researchers (e.g., investigating topics and employing methodologies of interest to scholars of other disciplines) so as to enhance the knowledge transfer from IS to other disciplines.

Citation analysis has become a well-established procedure for examining knowledge exchange (Garfield 1979). However, despite its extensive use, citation analysis is not without its drawbacks. First, the number of citations made to a specific article could be affected by the number of researchers working in the areas related to that article. Second, IS researchers also publish in journals from other disciplines, which makes it hard to assess MISQ's knowledge contribution in an unambiguous way. Third, the SSCI and SCI databases have the most extensive citation coverage available, but it is by no means complete. The exclusion of some journals from the two databases results in an underrepresentation of the contribution of some of the source articles.

This study can be extended in several ways. Future research could consider other years of MISQ articles, or examine other major academic journals in the IS field, which will shed light on the maturity of the IS discipline. Future research could also consider comparing the quality indices of top IS journals with those of leading journals of other disciplines. Finally, future research could investigate the extent to which articles published in other disciplines and citing IS publications are written by non-IS scholars, so as to allow a more accurate assessment of the influence of IS research on cutting-edge studies in other disciplines.

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